Public Utility Commission of Texas

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Pat Wood, III
Chairman

Robert W. Gee
Commissioner

Judy Walsh
Commissioner

May 31, 1996

Mr. William F. Caton, Acting Secretary
Federal Communications Commission
1919 M. Street, N.W., Room 222
Washington, D.C. 20554

RE: CC Docket No. 96-98 (FCC 96-182)
In the Matter of Implementation of the
Local Competition Provisions in the
Telecommunications Act of 1996

Dear Mr. Caton:

Enclosed for filing with the Commission are single copies of two reviews by staff members of the Public Utility Commission of Texas (PUCT) of long run incremental cost (LRIC) studies filed last year with the PUCT by Southwestern Bell Telephone Company. These lengthy *ex parte* submissions were requested by Mr. David Sieradski, of the Commission's Competitive Issues Division, in connection with the PUCT's Reply Comments in the above-captioned matter. The first review, from Project No. 14091, analyzes studies of switching costs related to tone dialing and custom-calling features; the second, from Project No. 14561, analyzes studies of Network Access Channel costs.

Please acknowledge receipt by affixing an appropriate notation on the enclosed duplicate copy of this letter and returning this copy to me in the enclosed, self-addressed envelope.

Sincerely,

Vicki Oswalt
Director, Office of Policy Development

cc: International Transcription Services, Inc
Mr. David Sieradski (3 copies)

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Vicki Oswalt
Director Office of Policy Development

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PUCT Project No. 14091
Staff Comments and Recommendations

PROJECT NO. 14091

SOUTHWESTERN BELL TELEPHONE COMPANY'S APPLICATION FOR APPROVAL OF LRIC STUDIES FOR CALL FORWARDING VARIABLE PER LINE, CALL WAITING PER LINE AND TOUCHTONE PER LINE, PURSUANT TO P.U.C. SUBST. R. 23.91	§ § § § § § § §	PUBLIC UTILITY COMMISSION OF TEXAS

GENERAL COUNSEL'S COMMENTS ON SOUTHWESTERN BELL TELEPHONE COMPANY'S LRIC STUDIES FILED IN PROJECT NO. 14091

COMES NOW the General Counsel of the Public Utility Commission of Texas, representing the public interest, and files its comments on the LRIC studies filed by Southwestern Bell Telephone Company (SWB) in the above-noted project, and respectfully shows the following:

I. COMMENTS

Attached is a memorandum from Mark MacLeod, Telephone Division Economist, concerning Staff's comments and recommendations in the above-noted LRIC studies. Also attached are Staff's comments and recommendations. General Counsel concurs with Staff's comments and recommendations. Moreover, as Mr. MacLeod notes in his cover memorandum, SWB has indicated its willingness to file amended LRIC studies incorporating all but one of

Staff's recommendations no later than 60 days following the issuance of the Administrative Law Judge's order in this project.

Because of the changes required by Staff's recommendations in this project and because the LRIC studies SWB has due on July 8, 1995, will be due shortly after the Administrative Law Judge's ruling in this project. General Counsel and Staff believe SWB should have the option of filing the July 8th LRIC studies on August 8, 1995 if SWB determines the additional time is necessary.

As also noted by Staff on page 21, line 5 of Staff's recommendation, General Counsel and Staff reserve the right to challenge specific applications of the SCIS cost model in future LRIC studies if Staff believes SWB is using the cost model in a manner inconsistent with the principles, instructions, and requirements set forth in P.U.C. SUBST. R. 23.91. This reservation should not, however, be taken as an indication that General Counsel and Staff believe SWB is using or has used the SCIS cost model in a manner inconsistent with the requirements of P.U.C. SUBST. R. 23.91, but merely the right to challenge the use of the model should the need arise. In addition, General Counsel and Staff reserve the right to reexamine factors approved for the purposes of these LRIC studies in later studies.

CONCLUSION

WHEREFORE, PREMISES CONSIDERED, General Counsel requests that the Administrative Law Judge order SWB to file amended LRIC studies incorporating Staff's recommendations no later than 60 days following the issuance of the Administrative Law Judge's order in the affected projects and in addition, that SWB be given an additional 30 days, to August 8, 1995, to file the SWB LRIC studies due on July 8, 1995, should SWB need the additional time to incorporate the changes required by this project.

Respectfully Submitted,

Nolan F. Ward
General Counsel

Martin Wilson
Deputy General Counsel

Roger E. Peña
Assistant General Counsel
State Bar No. 15740700
Public Utility Commission of Texas
7800 Shoal Creek Blvd., Suite 118W
Austin, Texas 78757
(512) 458-0287
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RP/lce
N:\RP-PL\COM091.DOC

PROJECT NO. 14091

CERTIFICATE OF SERVICE

I, Roger E Peña, Assistant General Counsel, certify that a copy of this document was served on all parties of record in this proceeding on this 26th day of May, 1995 by First Class, U.S. Mail, Postage Pre-paid

Roger E Peña
Assistant General Counsel

Public Utility Commission of Texas

Memorandum

To: Roger Peña
Assistant General Counsel

From: Mark MacLeod
Economist, Telephone Division

Date: May 26, 1995

Subject: Telephone Project No. 14091

SWB's Application for Approval of LRIC Study for Call Forwarding Variable Per Line, Call Waiting Per Line, and Touchtone Per Line, Pursuant to P.U.C Subst. R. 23.91

Comments and Recommendations

Please find attached Staff's comments and recommendations concerning SWB's Basic Network Function (BNF) LRIC Studies for Call Forwarding Variable Per Line, Call Waiting Per Line, and Touchtone Per Line (Project No. 14091).

The attached comments address the BNF LRIC Methodology using the Call Waiting BNF LRIC study for reference. However, the comments and recommendations will apply to all three BNF LRIC studies unless explicitly stated otherwise. Staff has communicated with representatives of SWB with regard to Staff's comments and recommendations. SWB has indicated its willingness to file amended cost studies incorporating Staff's recommendation (other than the recommendation regarding the identification of common costs, see page 44) no later than 60 days following the issuance of the Administrative Law Judge's order in these projects.

§ 23.91 BNF LRIC STUDY ANALYSIS

The following Staff comments and recommendations, developed in consultation with the Engineering Section of the Telephone Division and the Accounting Section of the Financial Review Division, concern SWBT's Long Run Incremental Cost (LRIC) Studies for Dual Tone Multi-Frequency Dialing Basic Network Function (BNF), Call Waiting BNF, and Call Forwarding BNF. These comments will first address the BNF LRIC Methodology using the Call Waiting Per Line BNF LRIC study for reference. However, the comments and recommendations will apply to all three BNF LRIC studies unless explicitly stated otherwise

I. BASIC NETWORK FUNCTION LRIC METHODOLOGY

The LRIC studies submitted by SWBT develop BNF costs in a two-step process:

A. **Determination of Capital Investment**. This includes all costs associated with purchasing, engineering, furnishing, and installing equipment.

B. **Determination of Annual Capital Costs and Annual Operating Expenses.** This step converts the total installed investment into an annual cost based on the service life of the investment and then calculates annual operating expenses that are caused by the investment.

C. **Conversion of Annual Costs to the Appropriate Unit Costs. The** total annual costs of providing a basic network function (annual capital costs and annual operating expenses) are summed and then converted to a cost per unit of the BNF.

This analysis summarizes the methods SWBT used in each step, the method Staff used to analyze each step, and any concerns Staff has with particular components of the cost studies.

A. Determination of Capital Investment

The determination of Capital Investment is a two-step process. First, SWBT determines the actual investment associated with the equipment used to provide the BNF. Second, SWBT determines the costs to engineer, furnish, and install the equipment. The sum of the equipment investment and the costs to engineer, furnish, and install the equipment equals *total capital investment*.

1. Determination of the Actual Investment Associated with the Equipment Used to Provide the BNF.

(a) Introduction

To derive the equipment investment used in the LRIC studies for switching BNFs, SWBT relies heavily on the Bellcore Switching Cost Information System (SCIS) costing model. This engineering-based model develops *capacity costs*[1] for LEC ***switch resources***, which are in turn used to develop *investment* for *switch functions*. *Capacity costs* are developed in the Model Office Module and *investment* is developed in the Feature Investment Module. It is this "investment" that is entered in Line 1 of the BNF LRIC

[1] Marginal Cost and Capacity Cost by J. Lee and V. Schmid-Bielenberger is a published treatise commonly cited as a defense for using capacity costs in LRIC studies for switch functions. The argument is that there is a *separately identifiable capital investment* required to provide a *specific switch function* as opposed to the switch being a common cost to all services that use the switch. The paper demonstrates that the capital investment roughly equals the cost of the capacity of the equipment required to provide the function. A copy of this paper is attached.

study (Schedule A of the Calculations Tab, in the SWBT Call Waiting Per Line BNF LRIC Study).

Table 1 is provided to facilitate the following discussion. The terms in Table 1 are not necessarily terms of art. They are meant to offer clarity and consistency in a discussion of complex processes. For this reason the table below is simplified, but it should be noted that both the Model Office Module and Feature Investment Module produce investment on a capacity cost basis. Several diagrams and examples are also provided in the ensuing discussion. The examples and diagrams are meant to be illustrative, and as such they are stylized and simplified representations of the actual processes occurring in the cost models.

Table 1

Module	**Type of Cost Calculated**	**Item Costed**	**Examples of Items Costed**
Model Office Module	Capacity Cost	Switch Resource	Line CCS, Memory, Central Processing
Feature Investment Module	Investment	Switch Function	Call Waiting

(b) The Model Office Module - Developing Capacity Costs

Within the Model Office Module a four-step process is used to calculate a capacity cost for a switch resource. The following discussion describes how the module calculates capacity costs for switch resources. In this discussion, "module" refers to the Model Office Module.

Step One:

The module develops a *model office*, which represents the optimal switch configuration for a particular central office (C.O.). The switch technologies used to develop a model office must represent least cost technologies as defined in § 23.91(f)(3). SWBT considers the following digital switches to be least cost technologies: the Northern Telecom DMS-10 and DMS-100, the AT&T 5ESS, and the Ericsson AXE-10. For each

switch technology, SWBT selected all of the actual C.O.s in service at the time the sample was taken to develop traffic engineering data to use as inputs to the module. For every C.O. used in the module, the company enters traffic engineering data for that C.O. Based on vendor-supplied engineering rules, an optimal switch configuration for that office is determined. The traffic engineering data include the number and type (digital or analog) of lines in the C.O., the utilization of the processor in the C.O., and other associated traffic data. An optimal switch configuration is determined for each C.O. used in the module. This optimal switch configuration is called the *model office*. (An example of the traffic engineering data input into the module for a DMS-100 equipped C.O. can be seen in DMS-100F Inputs '94 Model Office Version 7.1, Volume 2 of 8, on the four pages labeled 'HOST CLLI AUSTTXEVDSO' and 'Office Name: AUSTN/EVRGRN.')

Step Two:

The capacity costs of switch resources for each model office are calculated. A switch resource represents a unit of capacity for certain switch components. For example, Line Centum Call Seconds (Line CCS) is a switch resource. Its unit of capacity is 100 call seconds. This unit of capacity is adopted by convention; it refers to the fact that there is a total of 3600 call seconds in the busy hour (60 seconds per minute times 60 minutes in the busy hour) or 36 centum (hundred) call seconds The switch components that supply Line CCS are the Concentrator, the Controller, and the Switch Matrix. The actual terms used for switch resources and switch components vary from switch technology to switch technology and cost model to cost model. The capacity cost is C.O.-specific. For each C.O., the calculation is as follows:

- Determine which switch components are used in the provision of the switch resource.
- Determine the vendor prices for each component used. These are provided by the vendor.

- Determine the prices per unit of capacity for these components. The appropriate unit of capacity is supplied by the vendor. This is a simple division problem: Price of component / Appropriate unit of capacity.
- Apply the vendor discount to the prices per unit of capacity.
- The sum of these discounted prices per unit of capacity is the *capacity cost* for the *switch resource* for the specific C.O. These capacity costs are also referred to as *model office outputs*. (An example of the model office outputs for a DMS-100 equipped C.O. can be seen on the first page of the '94 Model Office Version 7.1, Volume 6 of 8 for the Austin/Evergreen C.O.)

Diagram One illustrates Step Two for Line CCS. Line CCS is a switch resource. Line CCS represents a unit of capacity for various line termination equipment such as the concentrator, the controller, and the switch matrix. The capacity cost of Line CCS represents the capacity cost caused by providing 100 call seconds of capacity of the concentrator, the controller, and the switch matrix in the busy hour. To develop the capacity cost of Line CCS, the SCIS model takes the vendor price of the concentrator and divides this by the CCS capacity per concentrator; this same operation is done for the controller and the switch matrix. Then the model sums the results of the three calculations and applies the company specific discount. This results in the capacity cost for Line CCS

Model Office Module
Example: Central Office-Specific Capacity Cost for Line CCS
Model Office #1, Switch Technology A (M.O. #1A)

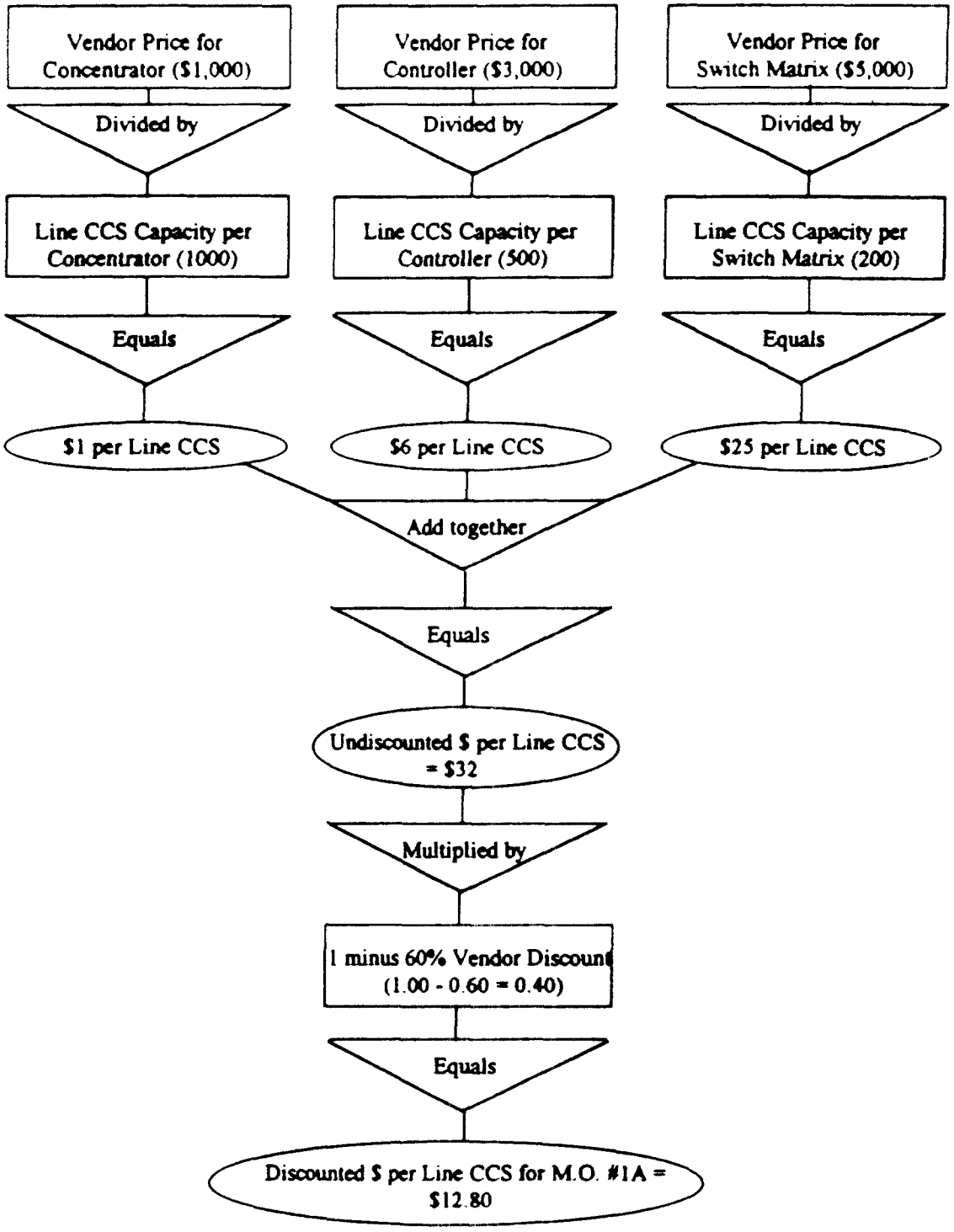

DIAGRAM 1

Note: The numbers used in this diagram are for illustrative purposes only.

Step Three:

For each switch technology, a weighted average capacity cost for the switch resource is calculated. This calculation is switch technology-specific. For each technology, the calculation is as follows:

- Use the capacity costs calculated in Step Two for the central offices that represent a particular switch technology.
- Weight the central office specific capacity costs based on the proportion of the total capacity for the switch technology that the central office represents.

The result is the technology-specific average capacity cost for the switch resource. Diagram Two illustrates Step Three for a particular switch technology. (An example of the technology-specific weighted average capacity cost output sheet for the DMS-100 can be seen in Outputs System Setup and Tables, '94 Model Office Version 7.1, Volume 4 of 8, on page entitled 'User Defined Study- DMS-100' the MO Output tab.)

Model Office Module
Example Switch Technology-Specific Capacity Cost for Line CCS
Switch Technology A

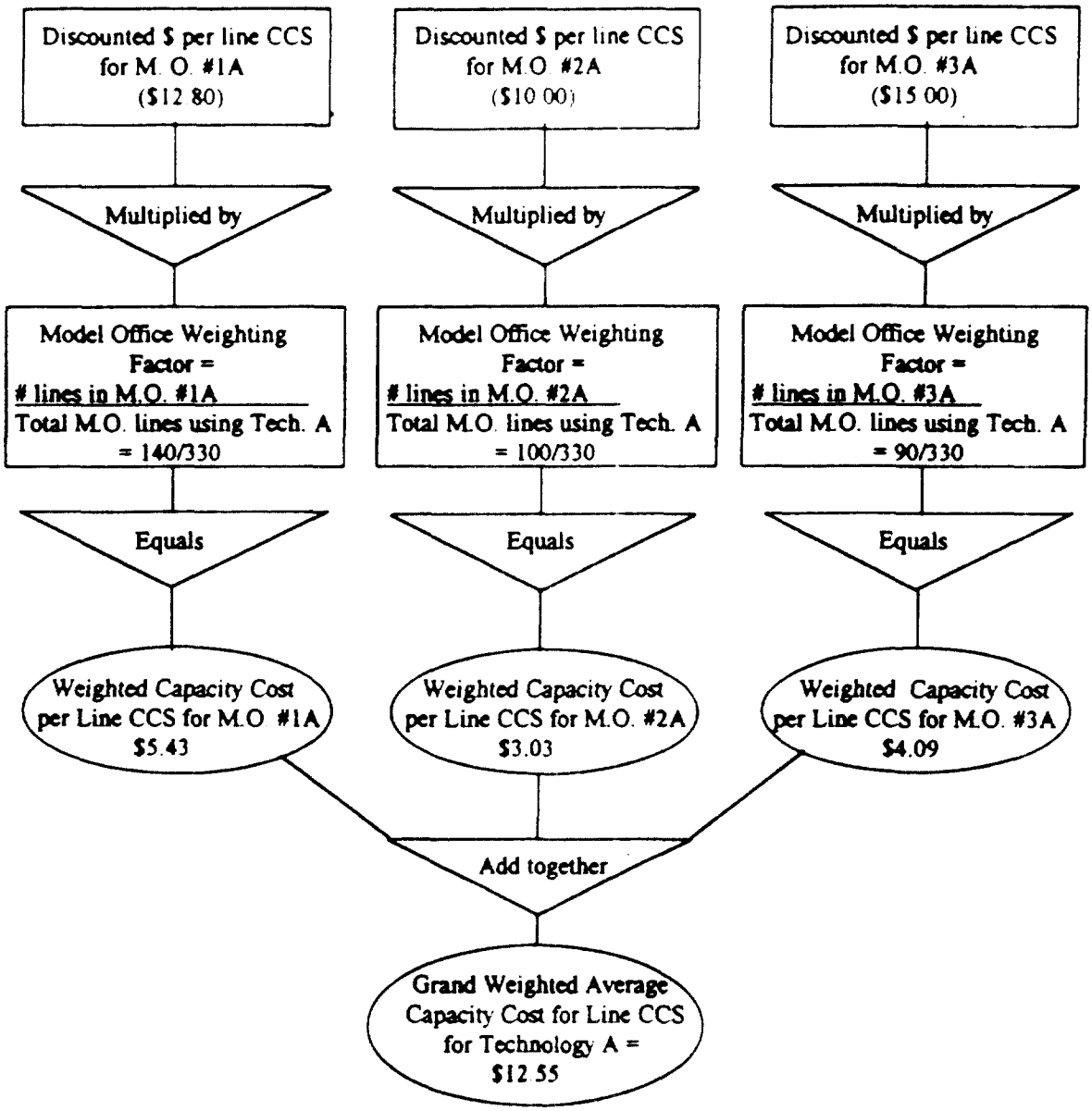

DIAGRAM 2

Note: The numbers used in this diagram are for illustrative purposes only.

(c) The Feature Investment Module - Developing Investment

The Feature Investment Module in the Bellcore SCIS translates switch resource *capacity costs* as calculated above into switch function *investments*. Switch functions as used in this discussion are generally analogous with the switching BNFs defined in § 23.91(c)(21) and described in the company's workplans filed in Docket No. 12481 with the exception that some BNFs represent a combination of switch functions. Examples of switch functions include Dual Tone Multi-Frequency Dialing, a Call Conversation Minute, and an Originating Call Setup. The following discussion describes how the feature investment module calculates investment for switch functions. In this discussion, "module" refers to the feature investment module

Step One:

Switch vendors provide engineering information as to how their switch provides a particular switch function, or in other words, how much of the different switch resources are required to perform a switch function in that vendor's switch. This information is used in the module. In addition, the local exchange company (LEC) enters actual traffic data associated with the switch function. For example, the LEC would enter the average number of Call Waiting call attempts (or activations) that occur in the busy hour on a line equipped with Call Waiting. The LEC-supplied traffic data could be entered for each switch technology, based on the traffic at the C.O.s selected to represent a particular switch technology. However, in these LRIC studies, SWBT uses statewide average traffic data to represent the average use of the function across all switch technologies.

Step Two

Based on the engineering information and traffic data entered in Step One and on the capacity costs developed in the model office module, the module calculates the investment required to provide the switch function. The investment calculated is switch technology-specific. For each switch technology, the calculation is as follows:

- Determine the amount of each switch resource required for the provision of one use of the switch function in the busy hour.
- For each switch resource, calculate the cost of one use of the switch function in the busy hour. This equals (capacity cost of switch resource) X (amount of switch resource for one use)
- Determine the average number of times the switch function is used in the busy hour for a line equipped with the switch function.
- Calculate the cost per line for a line with the average number of switch function uses in the busy hour. This equals: (cost of one use in the busy hour) X (average number of uses in the busy hour per line).
- Sum the costs per line for each switch resource. The result is the switch technology-specific *investment* for the *switch function*. (In the Texas 1995-1997 Call Waiting Per Line BNF Investment Study, an example of the equations and inputs used to calculate investment for the DMS-100 can be found on the page labeled 'Report Marginal 1; Marginal Investments,' 'Calculation: Marginal' and 'Technology: DMS-100.' An example of the output sheet with the Call Waiting investment for the DMS-100 can be found in the same study on the page labeled 'Report: Marginal 1; Marginal Investments,' 'Calculation: Marg-1 E,F&I' and 'Technology: DMS-100.')

Diagram Three illustrates Step Two for Call Waiting. A number of processes occur when a call is placed to an "occupied" line equipped with Call Waiting. Each process uses switch resources. For example, when a Call Waiting attempt is made, the switch must recognize the busy line, find out if the busy number has call waiting service, and if so, send the tone indicating another call is waiting to be connected. If the receiving party wants to accept the new call, he/she flashes the switch hook, the central office switch puts the first party on hold and completes the call to the second party. Subsequent switch hook flashes alternate whom is placed on hold and whom is connected. As can be seen by this example, a Call Waiting attempt requires many switch resources including Line CCS, Trunk CCS,

and memory. The Feature Investment Module identifies the switch resources that are used and the amount of each resource used in providing the switch function. The module also develops the investment required to provide the switch function for each switch technology.

Feature Investment Module
Example Switch Technology- Specific Investment for Call Waiting
Technology A

DIAGRAM 3

Note: The numbers used in this diagram are for illustrative purposes only.

Investment Module

Step Three:

A statewide average investment for each switch function is calculated. For each switch function, the calculation is as follows

- For each switch function, use the investment calculated in Step Two for each switch technology.
- Weight the switch technology-specific investment based on the proportion of total lines in the state (of SWBT) that the switch technology represents.
- This result is a statewide average investment for the switch function. (An example of this statewide average investment for the Technology Mix of the DMS-10, DMS-100, AXE-10, and 5ESS can be seen in the Texas 1995-1997 Call Waiting Per Line BNF Investment Study on the page labeled 'Report: Marginal 1; Marginal Investments,' 'Calculation: Marg-1 E,F&I' and 'Technology: Weighted.' The Technology Percentage is calculated and seen on Page 2 of the 1994 Texas Switch Weighting Factors binder, under the column labeled 'NALS.')

Diagram Four illustrates Step Three for Call Waiting.

Example: Statewide Average Investment for Call Waiting
All Technologies

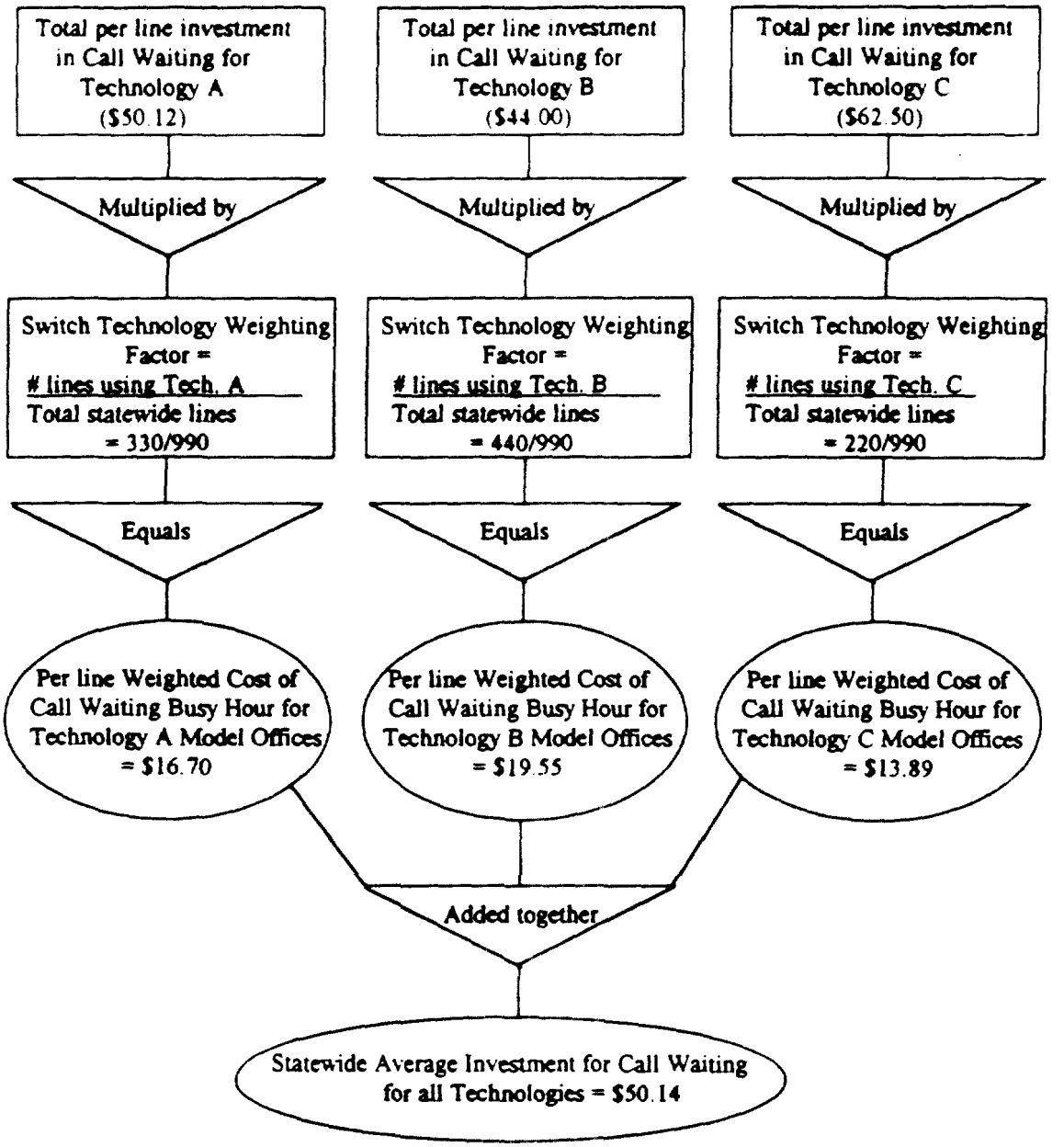

DIAGRAM 4

Note: The numbers used in this diagram are for illustrative purposes only.